

What is claimed is:

1. A method for making an anodic oxide coating on a valve metal electrically conductive comprising
 - 1) placing an anodized valve metal in a low water content polar aprotic solvent containing an ionogen;
 - 2) cooling the solvent to a temperature between -20°C and -60°C;
 - 3) inserting a counter electrode in said solvent; and
 - 4) connecting said valve metal and said counter electrode to a power supply so that the valve metal is biased positive and passing a current.
2. A method according to claim 1 wherein the valve metal is selected from the group consisting of tantalum, aluminum, niobium and titanium.
3. A method according to claim 1 wherein the polar aprotic solvent is selected from the group consisting of dimethyl formamide and about 25 vol % dimethylsulfoxide/75 vol % 4-butyrolactone.
4. A method according to claim 1 wherein said ionogen is selected from the group consisting of monocarboxylic acids, dicarboxylic acids, and sulfonic acids.
5. A method for coating an anodized valve metal oxide with a conductive polymer comprising the steps of:
 - 1) placing an anodized valve metal in a low water content polar aprotic solvent containing an ionogen;
 - 2) adding a monomer precursor for a conductive polymer;
 - 3) cooling the solvent to a temperature between -20°C and -60°C;
 - 4) inserting a counter electrode in said solvent; and
 - 5) connecting said valve metal and said counter electrode to a power supply so that the valve metal is biased positive and passing a current.

6. A method according to claim 5 wherein the monomerprecursor is selected from the group consisting of pyrrole, thiophene, aniline and derivatives thereof.
7. A method according to claim 5 wherein the valve metal is selected from the group consisting of tantalum, aluminum, niobium and titanium.
8. A method according to claim 5 wherein the polar aprotic solvent is selected from the group consisting of dimethyl formamide and about 25 vol % dimethylsulfoxide/75 vol % 4-butyrolactone.
9. A method according to claim 5 wherein said ionogen is selected from the group consisting of monocarboxylic acids, dicarboxylic acids, and sulfonic acids.

10 A method for plating a metal on an anodized valve metal oxide comprising:

- 1) placing an anodized valve metal in a low water content polar aprotic solvent containing an ionogen;
- 2) cooling the solvent to a temperature between -20°C and -60°C;
- 3) inserting a counter electrode in said solvent;
- 4) connecting said valve metal and said counter electrode to a power supply so that the valve metal is biased positive and passing a current until the oxide is conductive, and
- 5) connective said valve metal and counter electrode to a power supply so that the valve metal is biased negative;

wherein a salt of a conductive metal is added at any time after step 1.

11. A method according to claim 10 wherein said salt is selected from the group of a salts of silver, gold, copper and zinc salts.